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ABSTRACT

Asthma is an incurable respiratory disease characterized by increased responsiveness of the tracheobronchial tree to a variety of stimuli. Associated symptoms include shortness of breath, chest tightness, and a cough or wheeze. This resource booklet for child caregivers presents comprehensive information on the nature of asthma and caring for a child with asthma. Sections of booklet detail a variety of topics related to asthma including: the respiratory system, symptoms of asthma and how the disease is diagnosed, managing asthma in care and education settings, physiotherapy and breathing exercises, asthma education and self-management programs, how to know if a child has asthma, and what to do when a child suffers an asthma attack. Contains 15 references. (HTH)

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Understanding asthma *in* young children

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Leisa Holzheimer is currently conducting a community-based trial of the *Children's Asthma Education Resource Package*, designed to provide developmentally appropriate information about asthma for young children. Her work in paediatric asthma education during the past four years has been the basis of her postgraduate studies in education at the Centre for Applied Studies in Early Childhood, Queensland University of Technology. Leisa is also an experienced early childhood teacher.

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Numerous books, pamphlets and other educational material which provide information about childhood asthma are readily available. The Asthma Foundation in your state can provide information about these and advise which are most suitable for use in different situations.

NSW	The Asthma Foundation of New South Wales Unit 1, 82 Pacific Highway St Leonards NSW 2065	Tel: (02) 9906 3233 Fax: (02) 9906 4493
ACT	Volunteers available in the ACT. Contact the NSW Asthma Foundation for further information.	As above
NT	The Asthma Foundation of the Northern Territory PO Box 40456 Casuarina NT 0811	Tel: (08) 8922 8817 Fax: (08) 8922 8616
QLD	The Asthma Fpundation of Queensland PO Box 394 Fortitude Valley QLD 4006	Tel: (07) 3252 7677 Fax: (07) 3257 1080
SA	The Asthma Foundation of South Australia 329 Payneham Road Royston Park SA 5000	Tel: (08) 8362 6272 Fax: (08) 8362 2818
TAS	The Asthma Foundation of Tasmania 5/82 Hampden Road Battery Point TAS 7004	Tel: (07) 6223 7725 Fax: (03) 6224 2509
VIC	The Asthma Foundation of Victoria 69 Flemington Road North Melbourne VIC 3051	Tel: (03) 9326 7088 Fax: (03) 9326 7055
WA	The Asthma Foundation of Western Australia 61 Heytesbury Road Subiaco WA 6008	Tel: (09) 3821 666 Fax: (09) 3881 469

Understanding asthma in young children

What is asthma?

Asthma is an incurable respiratory disease characterised by increased responsiveness of the tracheobronchial tree to a variety of stimuli. The condition is evidenced by widespread narrowing of the air passages that may be relieved either spontaneously or with medication. Associated symptoms include shortness of breath, chest tightness, and cough or wheeze (International Asthma Management Project, 1992).

Asthma is so prevalent in our society that almost everyone knows someone who has experienced an asthma attack. While there is considerable public awareness of the condition, this coexists with significant misinformation, old wives' tales and myths, particularly about childhood asthma. This book provides current and accurate information about the causes, effects and management of asthma.

Reports suggest that asthma has become more prevalent during the past few decades (Australian Bureau of Statistics, 1995; Robertson et al., 1991). This may be attributed to:

- a true increase in prevalence and incidence;
- improvements in diagnostic techniques;
- increased awareness of asthma and willingness to label the condition as asthma rather than as other respiratory conditions.

Asthma affects approximately 10% of the adult population (Bauman et al., 1992; Abramson et al., 1995) and approximately 25% of children in Australia (Robertson et al., 1992). Most children with asthma experience infrequent and brief episodes with mild symptoms, while a small number experience a persistent form and require daily medication.

Improved understanding of the disease, better medication and medication delivery, and greater implementation of education strategies have lead to improved management of asthma and enhanced quality of life for people with the condition.

The respiratory system

During inhalation, air passes through the nose and mouth then via the trachea (or windpipe) to the lungs. These are located within the chest and protected by the rib cage. Before entering the lungs, the trachea divides into two branches—the right and left bronchus—which enter the right and left lung. Inside the lungs, the bronchi divide

Carers of young children with asthma should have:

- a thorough understanding of asthma and its management;
- the ability to exercise appropriate duty of care for children who have asthma;
- the ability to assist children who have asthma to optimally manage their condition.

Asthma affects approximately 25% of children in Australia

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The trachea divides into two branches which enter the right and left lung, and then divide many times into progressively smaller branches

The system of airways is often referred to as the bronchial tree.

- The trachea represents the tree trunk.
- The bronchioles represent the branches.
- The alveoli represent the leaves at the ends of the branches.

The breathing system, then, consists of a series of branching and progressively smaller hollow tubes through which air passes when we breathe in and out. At the very end of the smallest tubes are tiny thin walled bubbles where gases are exchanged with the blood stream.

many times into progressively smaller branches called the bronchioles which ultimately end in small balloon-like sacs called alveoli.

It is in the alveoli that the gas exchange occurs. Oxygen passes through the extremely thin surface of the alveoli into the blood stream and is circulated around the body. Similarly, carbon dioxide carried by the blood from various parts of the body passes from the blood through the alveoli wall into the bronchial tree and is then exhaled. Thus oxygen passes into the blood from air which is inhaled, and carbon dioxide passes from the blood and is exhaled.

All parts of the respiratory system are lined with mucosa. It is the mucosa that humidifies (warms and moistens) the air before it reaches the lungs and traps small particles of foreign matter, e.g. dust, that would otherwise be drawn into the lungs. The matter then moves back up the trachea and is eventually swallowed. This is a constant process which individuals are generally unaware of unless they have a respiratory infection or have substantial amounts of foreign matter caught in their airways.

Individuals will cough as the airways react by constricting and producing extra mucus to catch the particles, which then must be coughed up to stop airway blockage. People with asthma have hyper-reactive or over sensitive airways that react to much lower concentrations of allergens and irritants. The events that occur during an asthma attack are an exaggerated form of a normal lung reaction. Asthma is not an infection and is not contagious, so other people coming in contact with a child who has asthma will not develop the condition.

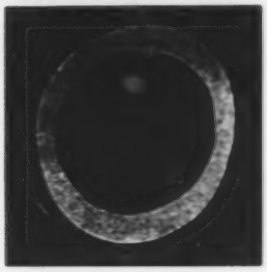
What are the symptoms of asthma?

An asthma attack is characterised by narrowing of the airways which makes breathing difficult.

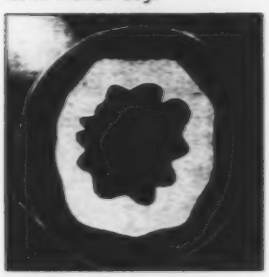
The symptoms of asthma often restrict activity and children may appear listless, be lacking in energy or uninterested in food. Children with asthma may not wheeze and shortness of breath or cough may be the only symptom. Conversely, wheezing can be caused from other forms of respiratory illness and does not necessarily indicate asthma.

The term 'wheezy bronchitis' is sometimes used to describe such symptoms in young children, however, this is usually early onset asthma. Most children who have persistent forms of asthma experience their first attack prior to five years of age, and in many cases prior to two years of age.

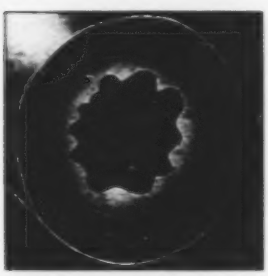
Diagram 1: Normal airway



Diagrams 2 & 3: Abnormal airways



Trigger factors lead to inflammation which narrows the airways



Tightening of muscle around the airways, with swelling and mucus in the airways

The airways or bronchi have three layers (see Diagram 1):

- the outer layer consists of incomplete rings of cartilage that give shape and rigidity to the bronchi;
- the middle layer consists of a circular layer of smooth muscle;
- the inner layer forms the lining of the bronchi and is called the mucosa. It consists of mucus, mucus producing glands, small hairy (cilia) cells, and immune cells sensitive to foreign matter (allergens and irritants).

The hollow centre of the bronchi or lumen is the space through which air is transported during the breathing process.

When the airways of a person with asthma react to inhaled foreign matter (allergens and irritants) three important events occur:

- the lining of the airways becomes inflamed and swollen;
- mucus and other substances are secreted into the lumen of the bronchi;
- the smooth muscle in the wall of the bronchi contracts (this contraction is similar to pulling the string of a draw string bag).

These events narrow the hollow space in the centre of the airway, restrict air flow, and cause breathing difficulty and/or wheezing. Less severe airway narrowing may result in involuntary coughing in an attempt to clear the airways.

Physical signs of asthma may include:

- rapid, shallow breathing;
- reported chest tightness, especially in the morning or following exercise;
- wheezing (whistling sound), particularly when exhaling;
- coughing, especially at night;
- indrawn chest margin near the abdomen and depression of the sternum (breast bone).

How is asthma diagnosed?

As asthma is a recurrent condition, it cannot be diagnosed on the basis of a single attack. A diagnosis may be determined by:

- parental reports of symptoms;
- physical examination;
- clinical tests;
- observation of response to bronchodilator medication.

Peak flow testing is rarely used with children under the age of six or seven years as it is difficult to carry out and results are often unreliable

Symptom history

The history is likely to include shortness of breath, recurrent cough and wheezy episodes. It may include episodes of allergic conditions, e.g. eczema and hay fever, and there is often a family history of asthma or related atopic (allergic) conditions (Jenkins et al., 1993; Landau, 1993). The child may be symptom-free between attacks but experience some degree of symptoms during an attack. In some children the wheeze may only be audible through a stethoscope. Breathing difficulty is evidenced by a rapid breathing rate and movement of the chest wall. Consequently the child is likely to appear 'puffed out', be lacking in energy and have restricted activity.

Clinical Tests

A lung function test assesses the child's ability to expel air from the lungs. A peak flow metre is the simplest device that measures the volume of exhaled air. Measurements are compared with norms for children of the same age and size. However, a normal peak flow reading at any one time does not exclude a diagnosis of asthma, as normal lung function should be present between attacks. Peak flow testing is rarely used with children under the age of six or seven years as it is difficult to carry out and results are often unreliable.

Skin and blood tests identify allergens: these are rarely used and are unlikely to assist in the management of childhood asthma.

Chest x-rays identify the location of air trapped in the airways or mucus blocking the bronchi and may exclude other forms of respiratory illness.

A peak flow metre measures the volume of exhaled air

Response to bronchodilator medication

Because asthma symptoms are similar to those of other respiratory infections, diagnosis is often difficult. Consequently, antibiotic medications are sometimes prescribed but rarely have beneficial effects in treating asthma. Bronchodilator drugs (reliever medications) relax the airway muscles and usually have a more rapid and

beneficial effect. Response to bronchodilator medications therefore provides an indication of the problem underlying the symptoms.

Types of asthma

Asthma is classified according to the severity and persistence of symptoms, and the frequency of attacks. Severity is determined by the degree of constriction of the bronchi as measured by the effect on lung function, i.e. the degree of breathing difficulty. Attack severity may vary from episode to episode. The fact that a child has only ever experienced mild attacks does not preclude the possibility of a severe attack. Similarly, the duration of attacks may vary from a few hours to several days, although rapid improvement usually results from administration of appropriate medication.

Children with asthma can be divided into three groups, defined by the frequency of attacks:

- Infrequent Episodic
- Frequent Episodic
- Persistent

Within each of these groups any individual attack may be mild, moderate or severe.

What causes asthma?

Although the mechanisms of asthma are now quite well understood, the reason for some people having hyper-reactive airways remains a mystery. A genetic factor is likely

Classification of Asthma

Infrequent Episodic	Infrequent Episodic	Persistent
• Affects approximately 75% of children with asthma • Acute attacks 6–8 weeks apart • Symptoms generally not severe • Symptoms rare between attacks • Lung function normal between attacks • Reliever medication for symptom control • Significant proportion of children outgrow asthma before adolescence • Condition does not seriously interfere with daily activities	• Affects approximately 20% of children with asthma • Acute attacks less than 6 weeks apart • Attacks more troublesome • Some symptoms between attacks • Lung function abnormal when symptomatic but normal at other times • First episode early in life • Daily preventative medication (due to frequency of attacks) with reliever medication for symptom control • Frequency and severity of attacks may decrease with age • Potential for attacks remains	• Affects less than 5% of children with asthma • Acute attacks 4–6 weeks apart • Nocturnal asthma more than once a week • Symptoms most days • Chest wall deformity may be apparent • History of emergency room visits and hospital admissions • Lung function may remain abnormal if condition is inadequately treated • First attack often occurs at less than 2 years • Daily preventative medication with reliever medication for symptom control • Unusual to outgrow asthma • Likely to experience symptoms into adult life

Adapted from National Asthma Campaign (1996)

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as individuals with asthma often have a family history of asthma or associated allergic conditions. The predisposition to hyper-reactive airways then, is probably inherited.

Many factors trigger asthma attacks. For some, these are clearly identifiable. Others may have multiple triggers or triggers that are not easily identified or that vary over time. Appropriate action can be taken to avoid or minimise the effect of triggers, but it is difficult to avoid all triggers whilst maintaining a normal life style. Therefore it is important to carefully evaluate the adverse psychological or social effects of restricting children's activities against the risk of an asthma attack. The following table lists some common triggers and suggests ways to minimise their impact in early childhood settings. Further consultation with parents, the child's medical practitioner and The Asthma Foundation is useful in determining reasonable precautions.

How is asthma managed?

Medication is the primary treatment for asthma, but physiotherapy and relaxation techniques sometimes complement drug therapy. Asthma education also plays an important role and aims to increase children's knowledge of asthma and their ability to manage the condition.

Child care services should have a good relationship with their local doctor in order to help get prompt attention when needed.

Both reliever and preventative medications are used in managing asthma. Each class of medication acts on different parts of the airway.

Reliever medication

Reliever medications or bronchodilators open the airways by relaxing contracted muscles in the walls of the airways, increasing air flow and making breathing easier. Reliever medications are used to provide symptom relief or prior to exercise for children with exercise induced asthma. Children with infrequent asthma usually only take reliever medication when a cough or wheeze starts to develop. Short acting reliever medications provide almost immediate relief from symptoms while the long acting variety may take 20–30 minutes to be effective, but open the airways for as long as 8–12 hours.

It is quite possible that some children will experience their first asthma attack whilst at child care. This is likely to be mild and not life threatening, but carers must exercise commonsense. If the child is in distress, is coughing or wheezing or experiencing shortness of breath, carers should seek prompt medical attention.(See page 13, *What should I do if a child in my care who is not a known sufferer has what appears to be an asthma attack.*)

What triggers asthma?

Trigger factors		Strategies for avoiding or minimising exposure to triggers
Infections	Respiratory infections • are the most common triggers • are usually viral (colds and flus)	• Avoid contact with those who have respiratory infections but handle placement of children tactfully; separation from peers may be unwarranted unless asthma is severe • Carefully monitor children's symptoms and follow asthma action plan if necessary
Allergens An allergen is something which triggers an allergic reaction.	Dust and dust mites Dust mites: • are microscopic insects • live in warm moist places • feed on skin cells shed from humans and animals The allergen is dust mite faecal droppings	Reduce dust in the environment, e.g. • dust and clean when children are not present dust using damp cloth • minimise carpeted areas, especially shag pile carpets • regularly vacuum carpets and change vacuum cleaner bags • maintain a well ventilated environment • regularly wash floors, upholstery, curtains and bedding • kill dust mites by washing with water over 55°C • keep soft toys to a minimum and away from bedding • wash or place soft toys in a plastic bag and freeze over night • do not use feather and wool pillows and bedding • use washable and removable pillow and mattress covers • air pillows and bedding weekly in sunshine
	Moulds Fungi and moulds: • are widespread and produce spores that become airborne • thrive in warm, moist conditions, e.g. food areas, bathrooms, laundry areas, indoor plants and compost heaps	Decrease mould growth and remove mould, e.g. • maintain a well ventilated environment • clean areas regularly, removing all visible mould • remove any spilt food and drink, and animal and plant matter from indoor and outdoor areas • remove indoor plants if necessary • regularly maintain and clean air conditioners when children are not present • do not use humidifiers
	Pollens • are a very common allergen • inhalation of airborn pollen is difficult to avoid • the concentration of pollen in the air is variable, but is generally higher on dry, windy days • sometimes pollen counts are reported over the radio or in newspapers	Limit exposure to pollens, e.g. • select low allergen plant • mow grass on weekends Restrictions on outdoor play are unnecessary for most children but may be needed on high pollen days for those with severe asthma

continued

What triggers asthma?

Trigger factors		Strategies for avoiding or minimising exposure to triggers
Allergens continued	Animal dander • particles of feathers, furs and skin of pets contribute to dust in the environment • it is uncommon for animal contact to trigger attack	Reduce contact with animal dander, e.g. • keep animals and birds outdoors • trial the removal of pets, reintroducing one at a time, and monitoring children's health • wash pets regularly
	Food and food additives • response to foods is uncommon but may be severe • includes naturally occuring substances and preservatives, enhancers and dyes: – metabisulphite/sulphur dioxide (Additive No's. 220–228) – monosodium glutamate (Additive No. 621) – tartrazine dye (Additive No.102) – salicylate (some fresh, canned or dried fruits, e.g. strawberries and tomatoes)	• be familiar with food additive codes and identify foods containing these substances (lists available from dietitians) • avoid the use of additives in meal preparation.
Seasonal/ climatic changes	• seasonal or sudden weather changes • cool evening air	• maintain constant indoor temperature
Exercise	• is a trigger for some children • may be the only trigger • is known as exercise induced asthma	• encourage all children to engage in physical activity • work out clear management procedures with parents well in advance in case of exercise induced asthma
Drugs	• some drugs interfere with the action of asthma medications and trigger attacks, e.g. aspirin, sedatives, some antibiotics and beta blockers (taken orally or as eye drops)	• monitor asthma symptoms when commencing new medication • notify parents and carers if symptoms occur to allow consultation with a medical practitioner
Irritants	Chemicals/fumes • includes aerosol sprays, perfumed products, soap, paint, cleaning products, detergents, ammonia, bleach and chlorine	• limit use of cleaning products when children are present • use low irritant, natural cleaning products, e.g. sugar soap and vinegar • avoid using or wearing perfumed products near children

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What triggers asthma?

Trigger factors		Strategies for avoiding or minimising exposure to triggers
Irritants continued	Cigarette smoke • is an important trigger	• actively maintain a smoke free environment • educate parents about the effects of passive smoking on children
	Environmental conditions • air pollution, e.g. car emissions and smoke from fires	• keep children indoors on high pollution days if necessary
Emotions	• emotions and stress may precipitate attacks • asthma is not a psychological condition and no personality type is particularly related to asthma • emotional state may impact on children's compliance with prescribed medication regimens	• calm children immediately if symptoms develop and continue to monitor condition • ensure correct medication is taken

Adapted from Heslep, Impey and Smith (1995), and Prince of Wales Hospital (1990)

Preventative medication

Children with frequent or persistent asthma often require medication to prevent asthma attacks. These anti-inflammatory medications control inflammation of the airways and so:

- reduce the swelling of cells lining the bronchi and the shedding of cells into the lumen;
- prevent the secretion of excess mucus and other substances;
- reduce the sensitivity of airways to triggers.

The airways, therefore, remain open and air flows more freely. Preventative medications must be taken regularly, even when the child is symptom free. Such maintenance treatment does not provide any immediate relief of symptoms but is often used in conjunction with reliever medication. Some preventative medications, e.g. Intal and Tilade, are also used prior to exercise to prevent exercise induced episodes.

Preventive and reliever medications used in the management of childhood asthma are outlined on page 10.

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Using a nebuliser. These are now used less frequently

Medication delivery devices

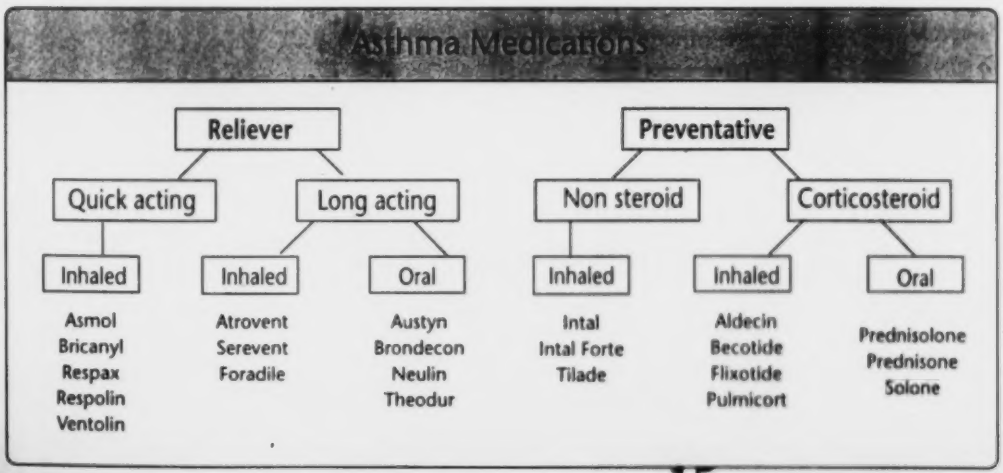
Inhaled asthma medications produce fewer side effects and a quicker response than oral medications because they are deposited directly in the lungs and do not require absorption into the blood supply.

Inhaled medications are dispensed via a metered dose inhaler, either an aerosol inhaler (puffer) or dry powder inhaler, e.g. turbuhaler. For ease of identification, particularly in emergency situations, medication inhalers are colour-coded according to medication class. Short acting reliever medications are blue or grey in colour, and long acting reliever medications are packaged in green tones. Preventative medications are packaged in white and warm autumn tones including yellow, apricot, brown or red.

Metered dose aerosols can be used with or without the aid of a spacer. These large volume spacers, e.g. Volumatic or Nebuhaler, simplify the dispensing of medication and make its delivery more effective than with a puffer alone. Spacers are particularly useful for children under eight years of age, who typically have difficulty using puffers correctly.

For ease of identification ... medication inhalers are colour-coded according to medication class

A spacer consists of a cylindrical or oval shaped chamber with a valve at one end, and a hole at the other where the puffer is inserted. The puffer is shaken vigorously and inserted into the spacer. Medication is dispensed into the spacer by depressing the puffer. The child takes regular breaths through the valve and medication passes efficiently into the lungs. With appropriate instruction, children as young as two years of age can correctly take medication using a spacer. Many



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older children and even adults also prefer to use a spacer because administering medication is easier and the dose is more accurate and reliable. Infants and very young children may use a modified spacer, e.g. Aerochamber, that has an opaque mask which fits over the mouth and nose.

Nebulisers may be used with infants and children who have experienced severe attacks. These are now used less frequently as children find the spacer quicker and equally efficient in drug delivery.

Severe attacks may be managed for a few days with doses of oral corticosteroids, e.g. prednisolone. Hospital admission and intravenous medication could be required if the symptoms are unresponsive to current treatment.

Physiotherapy and breathing exercises

Chest percussion is occasionally used to loosen mucus in the lungs, allowing it to be coughed up and so reducing airway congestion. Physiotherapy is sometimes used to improve the child's posture and aid breathing. Controlled breathing techniques that assist children to control asthma attacks may also be taught.

Relaxation

Excessive stress can precipitate asthma attacks and, when attacks occur, anxiety and tension can intensify symptoms. Learning relaxation techniques can therefore reduce the likelihood of attacks and limit the intensity of symptoms during attacks.

Asthma education and self management programs

Providing children with information and encouraging their active participation in asthma management can improve compliance with prescribed medication regimens and health. Most education programs target children over eight years of age as it was previously believed that younger children were unable to comprehend health related information and master management skills, e.g. correct technique for taking medication. Recent research (Holzheimer, Mohay & Masters, 1995; Holzheimer & Mohay, in press) has, however, demonstrated that the use of developmentally appropriate education resources increases young children's knowledge about asthma, improves medication compliance, and reduces the frequency of asthma related symptoms. Such educational resources are suitable for use in early childhood programs and can be beneficial for all children.

A spacer and puffer

A spacer with puffer inserted

Spacers are particularly useful for children under eight years of age

Managing asthma in care and education settings

How do you know if a child has asthma?

Any of the following symptoms may indicate asthma:

- shortness of breath;
- cough (persistent cough may be the only symptom);
- wheeze (may or may not be audible);
- indrawn chest wall near the abdomen and/or depression of the sternum;
- lack of energy and disinterested in food.

How do I manage a child who has asthma?

Clear procedures should be worked out well in advance with parents.

Increased understanding about asthma will allow carers to appropriately manage the condition in cooperation with the child who has asthma, and his or her parents. It is essential that all staff are aware of the management needs of each child who has asthma and the first aid treatment to be implemented in emergency situations. Early childhood carers and educators can help children to understand the condition when symptoms are first experienced.

What do I need to do to care for a child who has asthma?

- Ensure all staff are familiar with policies provided by the governing body of your centre or school, e.g. Quality Improvement and Accreditation System (QIAS)—Principles 44 and 45 (National Childcare Accreditation Council, 1993) that relate to the management and emergency treatment of asthma attacks and storage and administration of medication. These will be specific to each state and care or education setting, and your actions must be consistent with these recommendations.
- Have an appropriately trained person, e.g. asthma educator or medical practitioner, conduct training sessions for all staff on asthma management and demonstrate the correct techniques for using, maintaining and cleaning medication devices.
- Obtain up to date details about the child's asthma signed by parents or guardians including:
  - the severity of the condition;
  - frequency of attacks;
  - triggers, if known;
  - any early signs which indicate deterioration of the child's condition and onset of an acute attack;
  - name of medication, identifying as either reliever or preventative medication;
  - usual medication dosage;
  - medication needed prior to exercise if asthma is induced by exercise;
  - method of dispensing medication, including correct technique for using, maintaining and cleaning this device;
  - name and contact numbers of the child's medical practitioner, and any hospital or clinic the child attends; and
  - contact numbers for parents and/or guardians.
- The child's medical practitioner should provide the parents with an asthma action plan which outlines the steps to be taken when the child's condition deteriorates or during an acute attack. Ensure that:
  - the centre has an up-to-date copy of each child's asthma action plan signed by parents/guardians and that this is checked regularly, e.g. monthly, to record any changes;

– the plan is readily accessible to all staff responsible for caring for the child, i.e. posted in relevant places (QIAS Principle 45); and
– all staff are familiar with and are able to implement the steps outlined on the plan.

- Ensure each child's routine medication is correctly administered as required, e.g. medication may be required before engaging in physical activities.
- Record the time medication is administered and in what quantities.
- Maintain a supply of the child's medication and delivery device, e.g. spacer, in a safe place which is known and readily accessible to all staff who are responsible for the care of the child.
- Maintain asthma first aid kits which can be used at the centre during emergencies or taken on excursions. Parents should contribute up-to-date medication and devices for their own child. The kit should include:
  – documentation which identifies children who have asthma and their asthma action plans along with a signed statement from parents giving permission for the centre to administer medication in an emergency situation, e.g. on a day that medication has not been prescribed for that child:
  – reliever medication, e.g. Ventolin, Respolin, Bricanyl;
  – large volume spacer, e.g. Volumatic, Nebuhaler, Aerochamber;
  – instructions for asthma first aid and administration of medication.
- Parents should regularly check how much medication is left in an aerosol canister by placing it into a fairly large container of water. If the canister:
  – lies at the base of the container, it is full;
  – floats vertically, it is approximately half full;
  – floats horizontally, it is empty.
- Regularly check the use-by date of all asthma medication.
- Take appropriate precautions to avoid unnecessary exposure to identified triggers (see section on triggers).
- Include education about asthma in the health curriculum. This will assist children to have a better understanding of asthma and display greater empathy towards children who have the condition. It is

What should I do if a child in my care *who is a known asthmatic* has an asthma attack?

In the event of an acute attack, follow the steps outlined on the child's asthma action plan or immediately implement steps for asthma first aid as recommended by The Asthma Foundation (1992):

1. Sit the child down, remain calm and reassure the child.
2. Immediately administer four puffs of reliever medication (e.g.Ventolin, Respolin or Bricanyl), preferably via a spacer.
3. If there is no improvement after four minutes, give another four puffs of reliever medication.
4. If there is no improvement, immediately call an ambulance. Continue repeating Steps 2 and 3 while waiting for the ambulance.
5. Notify parents of the child's condition and your action as soon as possible.

What should I do if a child in my care *who is not a known sufferer* has what appears to be an asthma attack?

In the event of what appears to be an asthma attack:

1. Follow your state's guidelines regarding the administration of medication.
2. Check the child's airways are not blocked.
3. Sit the child down, remain calm and reassure the child.
4. Immediately call your local doctor for advice.
5. Notify parents of the child's condition and your action as soon as possible.

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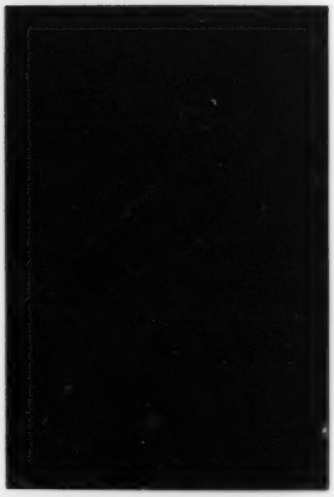

It is important that children learn the correct technique for taking medication under adult supervision

appropriate for young children to develop an understanding of the:
  - respiratory system and its function;
  - nature of asthma (symptoms and mechanisms);
  - purpose and function of medication
  - correct technique for taking medication under adult supervision;
- Provide developmentally appropriate information using the correct terminology associated with asthma management, e.g. terminology associated with body parts, medications and devices.
- Provide information about childhood asthma for parents in your resource library, enrolment information package and parent information sessions.

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